

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor: Erwin BAYER et al.  
Serial No.: 10/538,519  
Filing Date: November 7, 2005  
For: FRICTION-WELDING DEVICE  
Art Unit: 1793  
Examiner: Erin Barry SAAD  
Confirmation No.: 3569

Address to:  
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Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office via the Office electronic filing system **August 19, 2009**.  
Signature: /Helen Tam/  
Helen Tam

**TRANSMITTAL OF APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37**

S I R:

Transmitted herewith for filing in the above-identified patent application is an Appeal Brief Pursuant to 37 C.F.R. § 41.37.

The required Appeal Brief fee of **\$540.00** under 37 C.F.R. 41.20(b)(2) is being paid by credit card. Additionally, Applicants hereby request a **four-month extension of time** for filing the Appeal Brief. A Notice of Appeal was filed and received by the U.S. Patent and Trademark Office on March 13, 2009 for which a two-month period to file an Appeal Brief, expiring on May 13, 2009, was set. The four-month extended period for response expires on **September 14, 2009**, September 13, 2009 being a Sunday. The four-month extension fee of **\$1,730.00** is being paid by credit card.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. **11-0600**.

Respectfully submitted,  
KENYON & KENYON LLP

Dated: August 19, 2009

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES

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In re Application of:	:	Examiner: Erin Barry Saad
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**APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37**

SIR:

On March 13, 2009, Appellants filed a Notice of Appeal from the last decision of the Examiner contained in the Final Office Action dated November 13, 2008 in the above-identified patent application.

In accordance with 37 C.F.R. § 41.37, this brief is submitted in support of the appeal of the rejections of claims 10 to 15, 20, and 21. For at least the reasons set forth below, the final rejections of claims 10 to 15, 20, and 21 should be reversed.

**1. REAL PARTY IN INTEREST**

The real party in interest in the present appeal is MTU AERO ENGINES GmbH of Muenchen in the Federal Republic of Germany, which is the assignee of the entire right, title and interest in and to the present application.

**2. RELATED APPEALS AND INTERFERENCES**

There are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, MTU AERO ENGINES GmbH, "which may be related to,

directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal."

**3. STATUS OF CLAIMS**

Claims 1 to 9 have been canceled.

Claims 10 to 21 are pending.

Claims 16 and 18 are allowed.

Claims 17 and 19 have been withdrawn.

Claims 10 to 12, 14, 15, 20, and 21 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of U.S. Patent No. 6,299,051 ("Tsujino") and U.S. Patent No. 6,326,717 ("Mattes").

Claim 13 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Tsujino, Mattes, U.S. Patent No. 6,617,766 ("Stoecklein et al."), and U.S. Patent Application Publication No. 2003/0086748 ("Culpepper").

A copy of the appealed claims, *i.e.*, claims 10 to 15, 20, and 21, is attached hereto in the Claims Appendix.

**4. STATUS OF AMENDMENTS**

In response to the Final Office Action dated November 13, 2008, Appellants submitted a "Reply Under 37 C.F.R. § 1.116" ("the Reply") on February 10, 2009. The Reply did not include any proposed amendments to the claims. As such, it is Appellants' understanding that the claims as included in the annexed "Claims Appendix" reflect the current status of the claims.

**5. SUMMARY OF CLAIMED SUBJECT MATTER**

Independent claim 10 relates to a friction-welding device 1, 2 for integrally joining components 3, 4, each component including a welding surface 5, 6. *Specification*, page 4, lines 25 to 35; page 5, lines 7 to 9; page 7, lines 21 to 26; and Figures 1 to 4. The device 1, 2 includes an oscillator 8, 9 adapted to generate a defined periodic movement of one of the components 3 and the welding surface 5 of the one of the components relative to another one of the components 4 that is held statically during welding and to the welding surface 6 of the another one of the components, the period movement including directions of movement parallel to the welding surfaces 5, 6. *Specification*, page 4, lines 30 to 31; page 5, lines 18 to 19; page 7, line 27; and Figures 1 to 4. The device 1, 2 includes a compression

device 10 adapted to press the welding surfaces 5, 6 of the one of the components 3 and the another one of the components 4 against each other at a defined force. *Specification*, page 5, lines 19 to 21; page 8, lines 8 to 10; and Figures 2 and 4. The device 1, 2 includes a cartridge 11 adapted to accommodate the one of the components 3 outside of a welding zone 7. *Specification*, page 5, lines 11 to 12; and Figures 2 to 4. The oscillator 8, 9 includes an even number of piezoactuators 12, 13, 14, 15, 17, 18, 19, 20 arranged in pairs at least approximately on a line of application, the piezoactuators prestressable with respect to the cartridge 11 under pressure generation from opposite sides by piezoelectric liner deformation, the piezoactuators displaceable with the cartridge 11 and the one of the components 3 synchronously oscillatingly at cartridge-side ends. *Specification*, page 5, lines 26 to 28; page 6, lines 3 to 5, and 20 to 22; page 6, line 33 to page 7, line 1; page 7, lines 27 to 29; and Figures 2 to 4.

## 6. **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

- A. Whether claims 10 to 12, 14, 15, 20, and 21 are unpatentable under 35 U.S.C. § 103(a) over the combination of Tsujino and Mattes.
- B. Whether claim 13 is unpatentable under 35 U.S.C. § 103(a) over the combination of Tsujino, Mattes, Stoecklein et al., and Culpepper.

## 7. **ARGUMENT**

### A. **Rejection of Claims 10 to 12, 14, 15, 20, and 21 Under 35 U.S.C. § 103(a)**

Claims 10 to 12, 14, 15, 20, and 21 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Tsujino and Mattes. It is respectfully submitted that the combination of Tsujino and Mattes does not render unpatentable the presently pending claims for at least the following reasons.

Claim 10 relates to a friction-welding device for integrally joining components, each component including a welding surface, including, *inter alia*, the features of an oscillator, a compression device, and *a cartridge adapted to accommodate the one of the components outside of a welding zone*, in which *the oscillator includes an even number of piezoactuators arranged in pairs at least approximately on a line of application*.

The combination of Tsujino and Mattes does not disclose, or even suggest, all of the features included in claim 10. For example, Tsujino merely indicates a sealing cap 1 and a substrate 2 between a base 9 and a bonding head 4. (Tsujino, col. 3, lines 30 to 50; and Figures 1 and 2). However, nowhere does Tsujino disclose a cartridge adapted to

accommodate the one of the components outside of a welding zone. Nonetheless, the Final Office Action at pages 5 to 6 asserts that bonding head 4 constitutes a cartridge accommodating the one of the components. In this regard, Tsujino plainly states that “the bonding head 4 is placed on the upper face 1b of the sealing cap 1.” (Tsujino, col. 3, lines 55 to 56). Thus, the bonding head 4 of Tsujino merely applies compressive force F on the upper face 1b of the sealing cap 1, and does not constitute a cartridge accommodating the one of the components. Therefore, Tsujino does not disclose, or even suggest, the feature of *a cartridge adapted to accommodate a component outside of a welding zone*, as provided for in the context of claim 10.

The Advisory Action at page 2 maintains that the bonding head 4 of Tsujino constitutes a cartridge and states that “[a]s defined by Merriam-Webster online dictionary, a cartridge is defined as ‘a case or container for holding a substrate.’” However, a “case” is defined as “a box or receptacle for holding something,” and a “container” is defined as “a receptacle (as a box or jar) for holding goods.” (Merriam-Webster’s Online Dictionary, 11<sup>th</sup> ed.). It is respectfully submitted that the bonding head 4 of Tsujino constitutes none of a case, container, box, receptacle, or jar. Instead, the bonding head 4 merely presents a flat surface that contacts upper face 1b of sealing cap 1. Accordingly, the bonding head 4 of Tsujino does not constitute a cartridge. Furthermore, while the bonding head 4 of Tsujino may constitute a compression device that applies a downward force F, it does not constitute the separate feature of a cartridge, as provided for in the context of claim 10. Therefore, Tsujino does not disclose, or even suggest, the feature of *a cartridge adapted to accommodate a component outside of a welding zone*, as provided for in the context of claim 10.

Further, Mattes also does not disclose, or even suggest, the feature of *a cartridge adapted to accommodate a component outside of a welding zone*, and thus, fails to cure this critical deficiency.

In addition, nowhere does Tsujino disclose the oscillator includes an even number of piezoactuators arranged in pairs at least approximately on a line of application. Instead, Tsujino merely indicates piezoelectric transducers 7,8 coupled to oscillation transmitting honed 5,6 “that are in an orthogonal direction to the welding head 4.” (Tsujino, col. 3, lines 37 to 42; and Figure 1). Thus, the piezoelectric transducers 7, 8 are situated orthogonal to each other, and not in pairs at least approximately on a line of application. Therefore, Tsujino does not disclose, or even suggest, the feature of *the oscillator includes an*

*even number of piezoactuators arranged in pairs at least approximately on a line of application*, as provided for in the context of claim 10.

The Advisory Action at page 2 maintains that Tsujino discloses the features included in claim 10 and states that “[w]hile the piezoactuators/oscillating transmitting bones of Tsujino are orthogonal, they are still arranged in pairs, as there are two (even number) next to each other on a line of application (same axis).” It is not understood how two actuators that are clearly orthogonal to one another can be considered to be arranged on a line of application, or on the same axis. In this regard, the forces imparted by each of the actuators of Tsujino plainly come together at a right angle at the bonding head 4. Furthermore, Tsujino at column 4, lines 8 to 13, specifically teaches away from linear oscillation in favor of two dimensional oscillation such as circular or elliptical. Therefore, Tsujino does not disclose, or even suggest, the feature of *the oscillator includes an even number of piezoactuators arranged in pairs at least approximately on a line of application*, as provided for in the context of claim 10.

Further, Mattes also does not disclose, or even suggest, the feature that *an oscillator includes an even number of piezoactuators arranged in pairs at least approximately on a line of application*, and thus, fails to cure this critical deficiency.

Accordingly, it is respectfully submitted that the combination of Tsujino and Mattes does not disclose, or even suggest, all of the features included in claim 10. Therefore, it is respectfully submitted that the combination of Tsujino and Mattes does not render unpatentable the presently pending claim for at least the foregoing reasons.

As for claims 11, 12, 14, 15, 20, and 21, which depend from claim 10 and therefore include all of the features included in claim 10, it is respectfully submitted that the combination of Tsujino and Mattes does not render unpatentable these dependent claims for at least the reasons more fully set forth above.

In view of all of the foregoing, reversal of this rejection is respectfully requested.

**B. Rejection of Claim 13 Under 35 U.S.C. § 103(a)**

Claim 13 was rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Tsujino, Mattes, Stoecklein et al., and Culpepper. It is respectfully submitted that the combination of Tsujino, Mattes, Stoecklein et al., and Culpepper does not render unpatentable the present claim for at least the following reasons.

Claim 13 depends from claim 10 and therefore includes all of the features included in claim 10. As more fully set forth above, the combination of Tsujino and Mattes does not disclose, or even suggest, the features of *a cartridge adapted to accommodate components outside of a welding zone and an oscillator that includes an even number of piezoactuators arranged in pairs at least approximately on a line of application*, as provided for in the context of claim 10. Stoecklein et al. and Culpepper also do not disclose, or even suggest, the features of *a cartridge adapted to accommodate components outside of a welding zone and an oscillator that includes an even number of piezoactuators arranged in pairs at least approximately on a line of application*, and thus, fail to cure these critical deficiencies.

Accordingly, it is respectfully submitted that the combination of Tsujino, Mattes, Stoecklein et al., and Culpepper does not disclose, or even suggest, all of the features included in claim 10, from which claim 13 depends. As such, it is respectfully submitted that the combination of Tsujino, Mattes, Stoecklein et al., and Culpepper does not render unpatentable claim 13, which depends from claim 10.

In view of all of the foregoing, reversal of this rejection is respectfully requested.

## **8. CLAIMS APPENDIX**

A “Claims Appendix” is attached hereto and appears on the two (2) pages numbered “Claims Appendix 1” to “Claims Appendix 2.”

## **9. EVIDENCE APPENDIX**

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131 or 1.132. No other evidence has been entered by the Examiner or relied upon by Appellants in the appeal. An “Evidence Appendix” is nevertheless attached hereto and appears on the one (1) page numbered “Evidence Appendix.”

## **10. RELATED PROCEEDINGS APPENDIX**

As indicated above in Section 2, “[t]here are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, MTU AERO ENGINES GmbH, ‘which may be related to, directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.’” As such, there are no “decisions rendered by a court or the Board in any proceeding identified pursuant to [37 C.F.R. § 41.37(c)(1)(ii)]” to

be submitted. A “Related Proceedings Appendix” is nevertheless attached hereto and appears on the one (1) page numbered “Related Proceedings Appendix.”

**11. CONCLUSION**

For at least the reasons indicated above, Appellants respectfully submit that the art of record does not disclose or suggest the subject matter as recited in the claims of the above-identified application. Accordingly, it is respectfully submitted that the subject matter as set forth in the claims of the present application is patentable.

In view of all of the foregoing, reversal of all of the rejections set forth in the Final Office Action is therefore respectfully requested.

Respectfully submitted,

Dated: August 19, 2009

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## **CLAIMS APPENDIX**

10. A friction-welding device for integrally joining components, each component including a welding surface, comprising:

an oscillator adapted to generate a defined periodic movement of one of the components and the welding surface of the one of the components relative to another one of the components that is held statically during welding and to the welding surface of the another one of the components, the period movement including directions of movement parallel to the welding surfaces;

a compression device adapted to press the welding surfaces of the one of the components and the another one of the components against each other at a defined force; and

a cartridge adapted to accommodate the one of the components outside of a welding zone;

wherein the oscillator includes an even number of piezoactuators arranged in pairs at least approximately on a line of application, the piezoactuators prestressable with respect to the cartridge under pressure generation from opposite sides by piezoelectric liner deformation, the piezoactuators displaceable with the cartridge and the one of the components synchronously oscillatingly at cartridge-side ends.

11. The friction-welding device according to claim 10, wherein the components include hydraulically effective blades having one of (a) disk- and (b) ring-shaped blade carriers.

12. The friction-welding device according to claim 10, wherein the friction-welding device is adapted to produce and repair integrally bladed rotor components of turbo machines.

13. The friction-welding device according to claim 10, wherein the compression device includes at least one piezoactuator having a piezoelectrically movable end couplable to the cartridge to introduce a defined compression force perpendicular to the welding surfaces.

14. The friction-welding device according to claim 10, further comprising a device adapted to enlarge relatively small, linear motions of the piezoactuators to generate greater movements having at least one of (a) straight and (b) curved paths.

15. The friction-welding device according to claim 10, wherein the device includes at least one of (a) a mechanical gear, (b) a lever mechanism, (c) a flat spring arrangement, (d) a cam gear and (e) a crank control.

20. The friction-welding device according to claim 10, wherein a force/path characteristic of the piezoactuators is selected by geometrical serial and parallel connection of piezoelements.

21. The friction-welding device according to claim 10, wherein a maximum required electrical voltage of the piezoactuators is limited by electrical serial and parallel connection of piezoelements.

### **EVIDENCE APPENDIX**

No evidence has been submitted pursuant to 37 C.F.R. §§1.130, 1.131, or 1.132. No other evidence has been entered by the Examiner or relied upon by Appellants in the appeal.

### **RELATED PROCEEDINGS APPENDIX**

As indicated above in Section 2 of this Appeal Brief, “[t]here are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, MTU AERO ENGINES GmbH, ‘which may be related to, directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.’” As such, there are no “decisions rendered by a court or the Board in any proceeding identified pursuant to [37 C.F.R. § 41.37(c)(1)(ii)]” to be submitted.